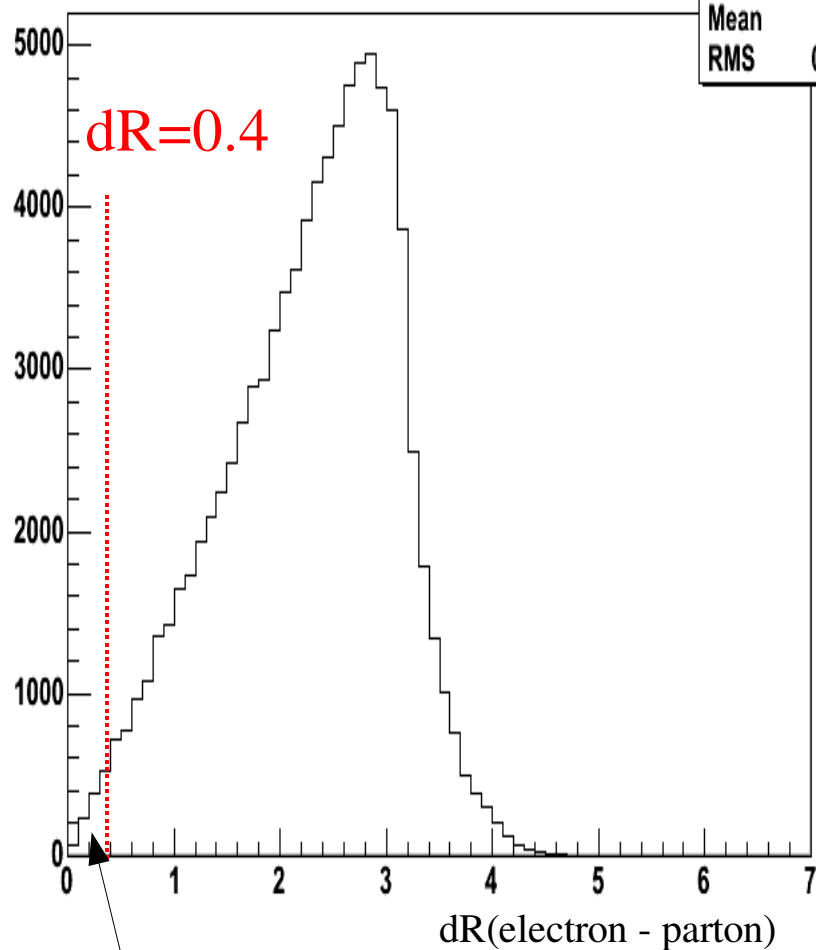# Electron-Jet-Overlap Study

03/07/05

On the next slide I'm trying to get an idea of how often
it happens that a parton is nearby an electron/positron.

Here I'm using the same MC as for the unsmearing studies:
- Z+1j Pythia with 2-to-2 processes, only generator info and particle jets
- Electrons/Positrons are generator level particles with pT>25, letal<1.1
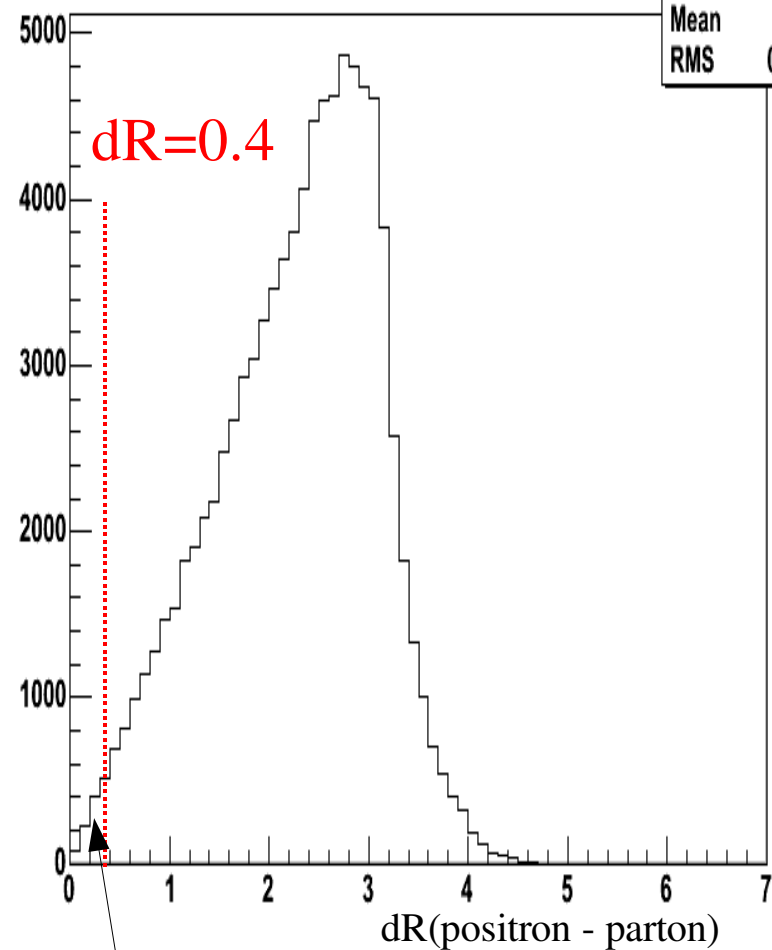- Partons are generator level quarks/gluons with pT>20, letal<2.5

dr_elec_part1

dr_elec_part1	
Entries	92187
Mean	2.274
RMS	0.8057

dR=0.4

dR(electron - parton)

dr_posi_part1

dr_posi_part1	
Entries	92187
Mean	2.273
RMS	0.8076

dR=0.4

dR(positron - parton)

1,226 out of 92,187 = 1.3%

1,224 out of 92,197 = 1.3%

1.3% + 1.3% = **2.6%** of partons are near the electron/positron from Z

03/07/05

Now I'm trying to estimate the acceptance corrections (for each inclusive jet multiplicity) due to the jets/partons that are removed when they are near the electron/positron within dR=0.4.

Again, I'm using the same MC as for the unsmearing studies:
- Z+1j Pythia with 2-to-2 processes, only generator info and particle jets
- Electrons/Positrons are generator level particles with pT>25, letal<1.1
- Partons are generator level quarks/gluons with pT>20, letal<2.5

To get the correction factors I divide two parton multiplicity histograms:
Numerator = inclusive parton multiplicity for all partons (pT>20, letal<2.5)
Denominator = incl. parton mult. for all partons outside of dR=0.4 w.r.t electron/positron from Z
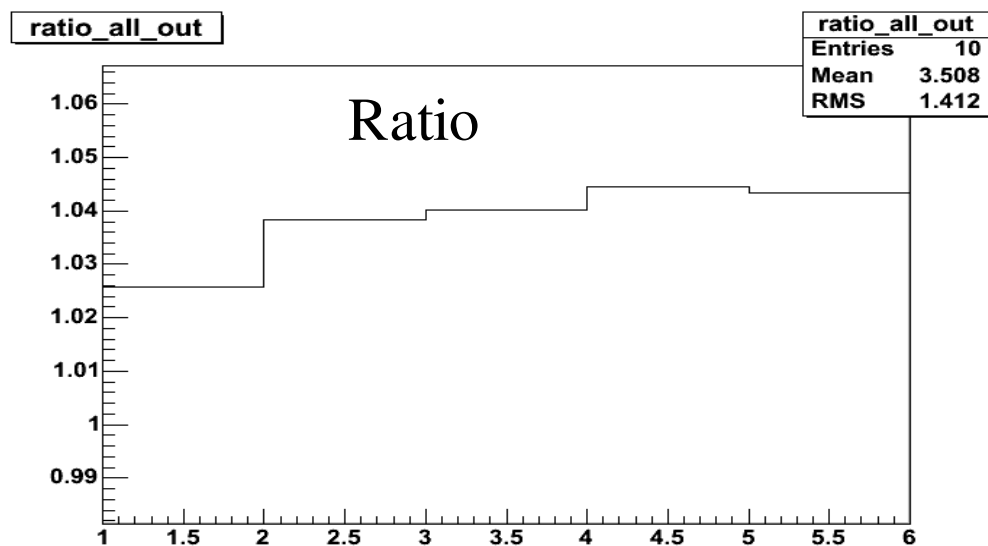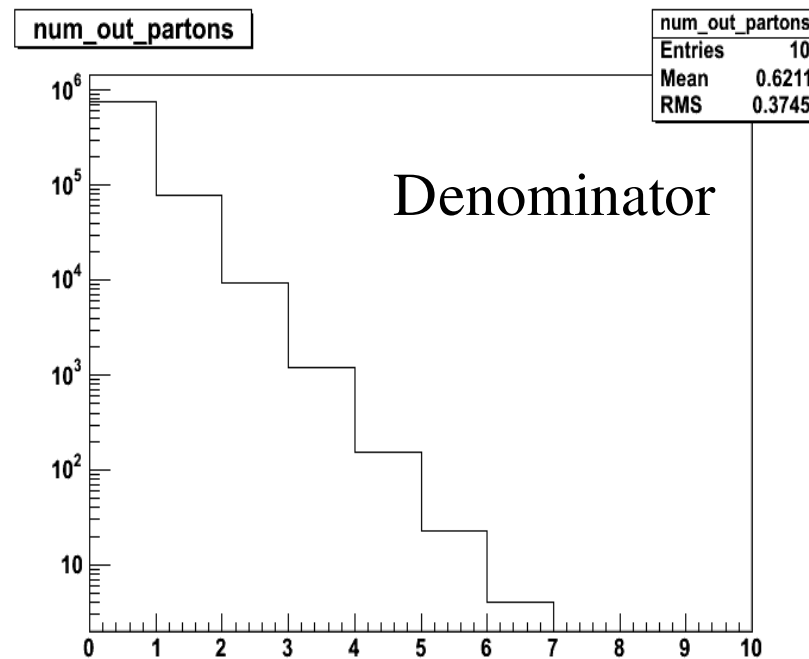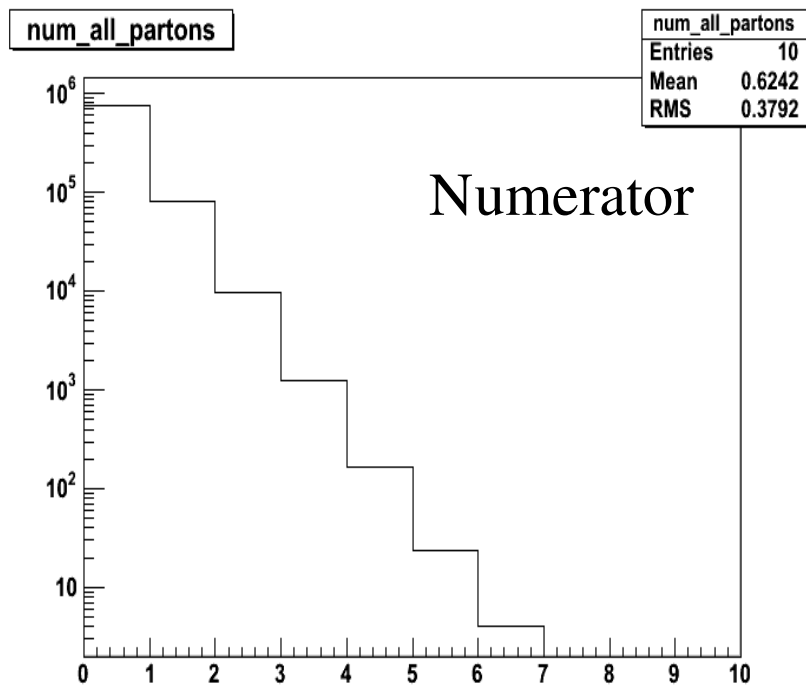
03/07/05

# partons	correction
1	1.026
2	1.038
3	1.040
4	1.044
5	1.043

03/07/05

In the following I'm trying to see wether a dR cut of 0.4 is too tight:

The next slide looks at the dR distribution between probe-tracks
(based on my standard tag-and-probe method) and reco'd CAL jets
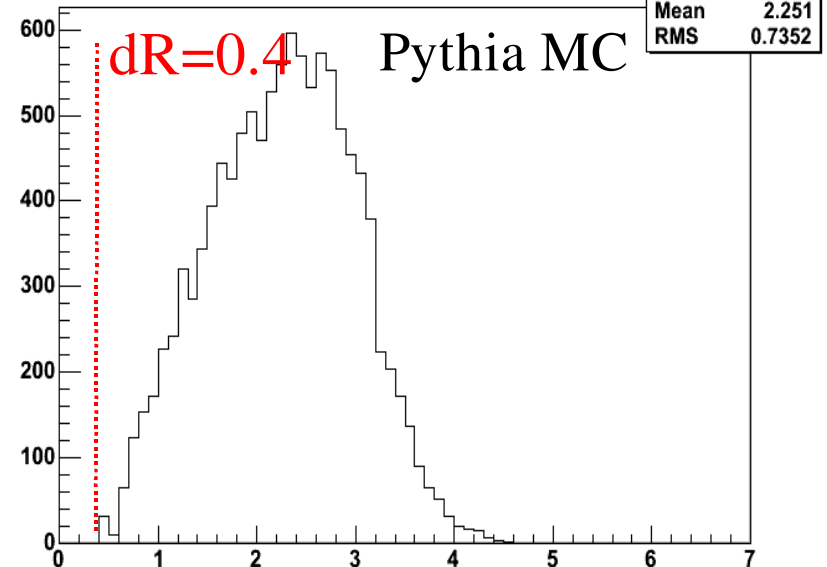(passing all the usual jet quality cuts):
- top row is Pythia MC
- bottom row is data
- left column is w/o elec-jet-overlap cut
- right column is with elec-jet-overlap cut (dR=0.4)

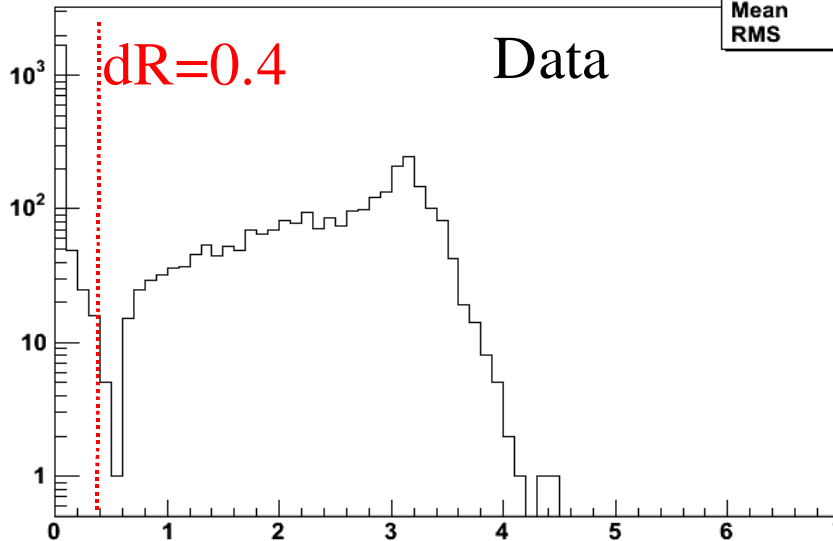# tag-and-probe method: dR between probe-track and all good jets
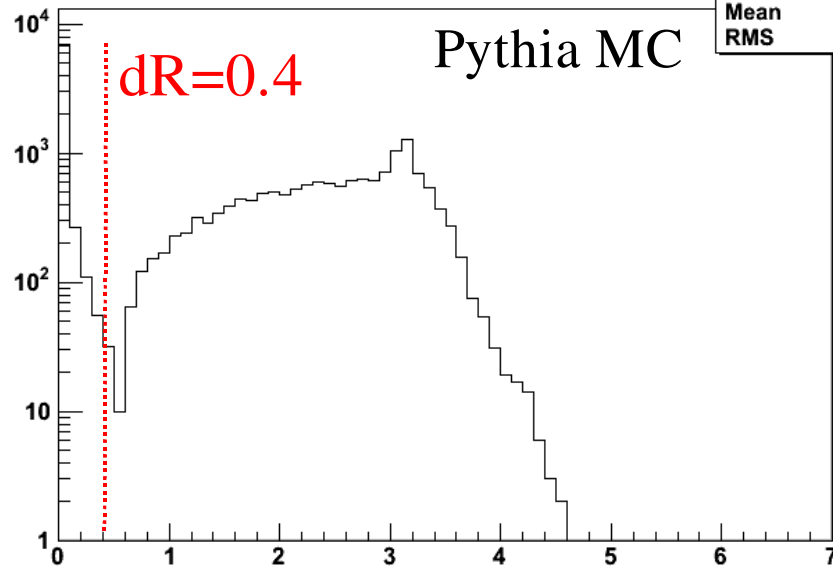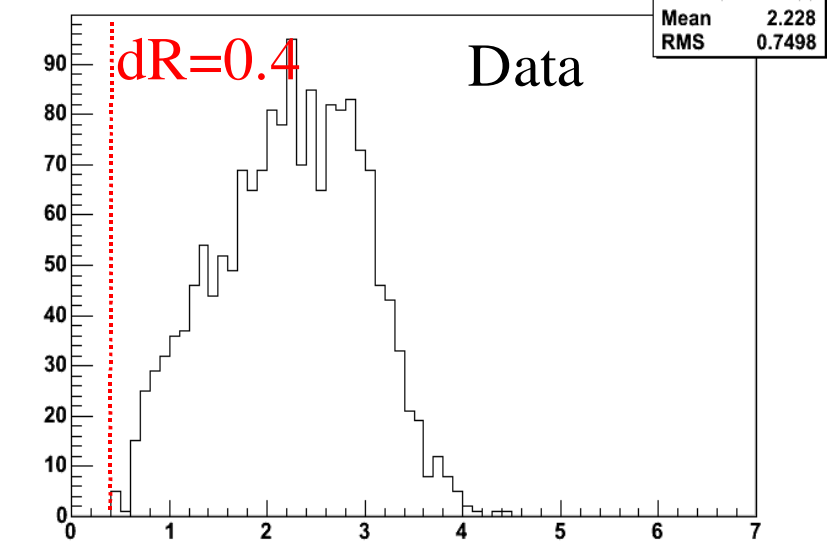
On the next slide I'm trying to understand how often it happens that a parton that is **outside** the dR=0.4 elec-jet-overlap-cone, has a reco'd CAL jet **inside** the cone, i.e. the jet algorithm merges the fake jet from the electron with the real jet so that the final jet is 'pulled' inside the cone.
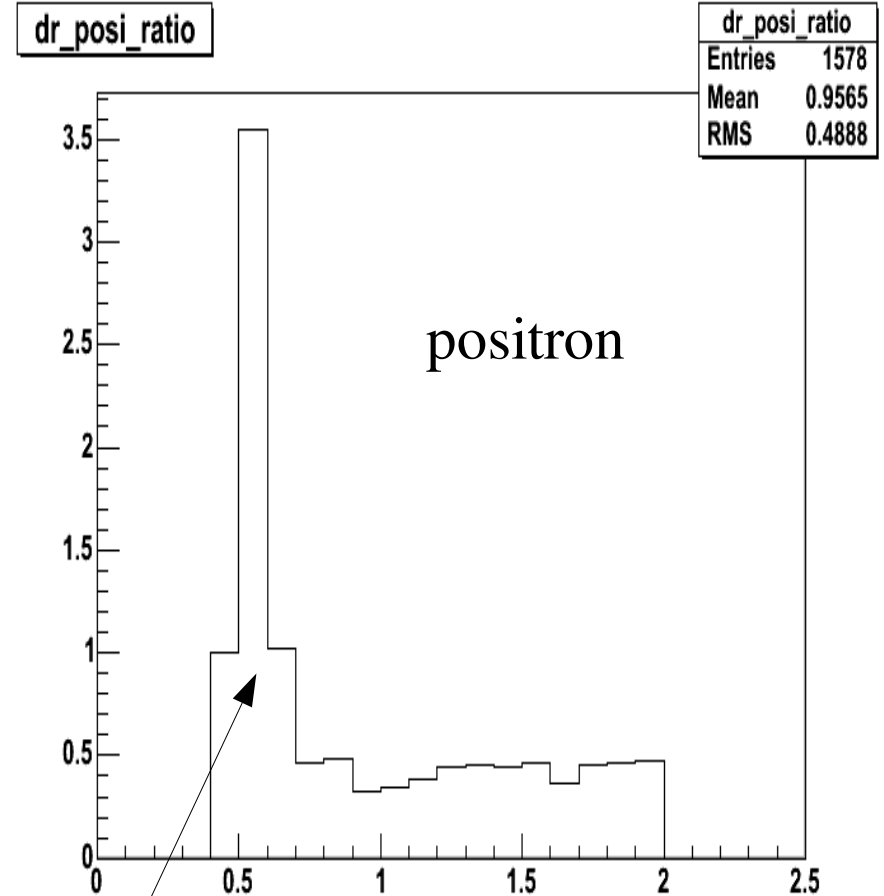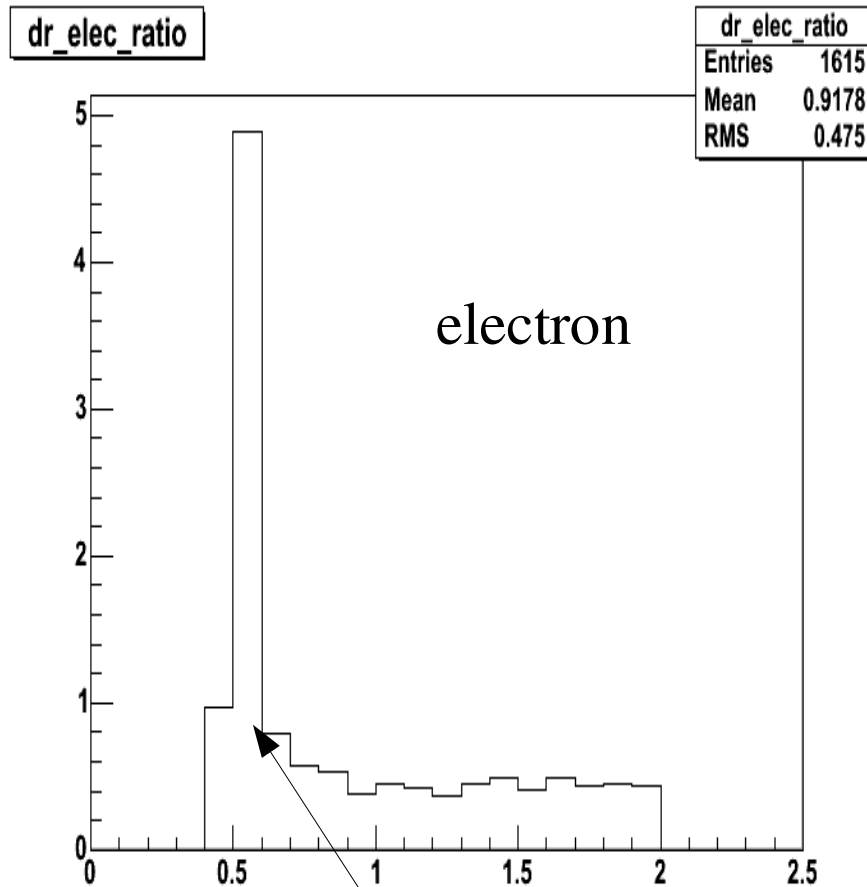
This is done using regular Pythia MC.
Electrons/Positrons are generator level particles with pT>25, letal<1.1
Partons are generator level quarks/gluons with pT>20, letal<2.5
CALjets are reco'd CAL jets passing all quality cuts.

03/07/05

Numerator = dR(generated electron/positron – parton)
Denominator = dR(generated electron/positron - CALjet)

dr_elec_ratio

dr_elec_ratio	
Entries	1615
Mean	0.9178
RMS	0.475

electron

dr_posi_ratio

dr_posi_ratio	
Entries	1578
Mean	0.9565
RMS	0.4888

positron

Looks like a large number of jets between dR=0.5 and dR=0.6 get 'pulled' away!

03/07/05